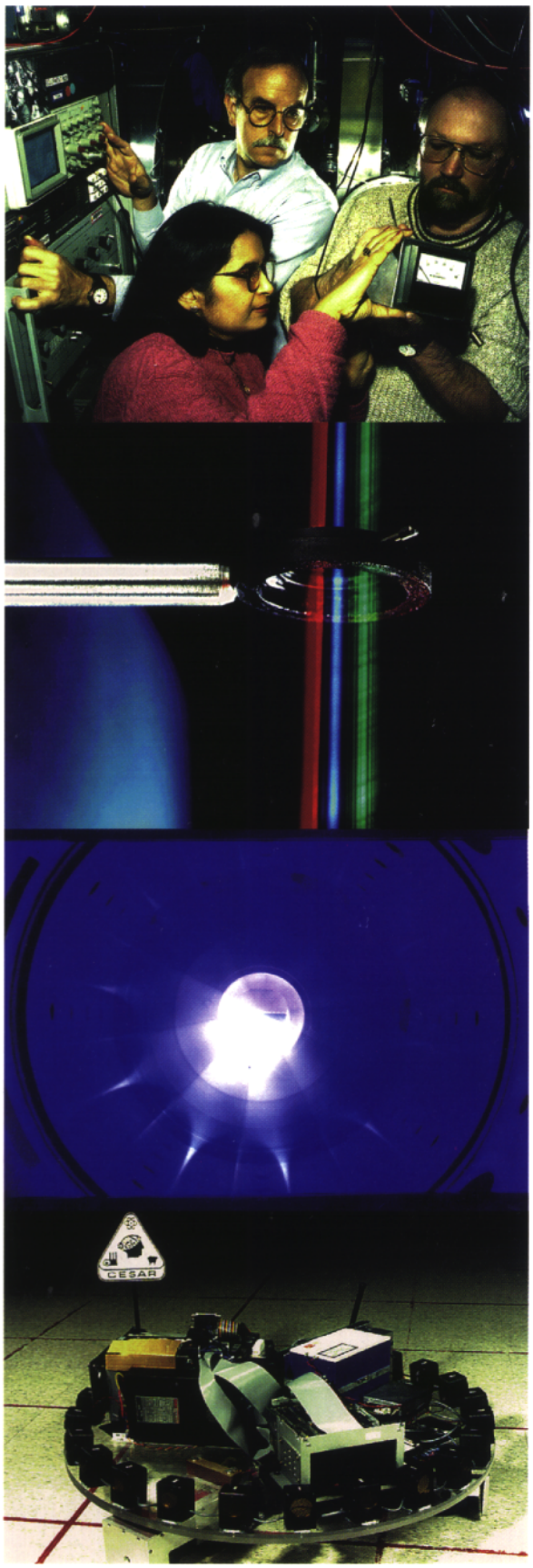
IN SUPPORT OF THE ENERGY MISSION



Surface Physics. BES supports multidisciplinary research in surface physics and chemistry that contributes to the development of solid and molecular catalytic materials, the understanding of structure-property relationships at surfaces, the development of ion beam and other surface processing techniques for novel semiconductors and thin films and for enhanced corrosion and wear performance, and the development of new techniques for probing surfaces at the atomic level.

Molecular Environmental Science. Fundamental research on the molecular-scale processes that affect environmental contaminants is key to understanding their fate and transport in the environment, their uptake in the biosphere, and their remediation and management. BES is the leader in the development of this new interdisciplinary field which provides a science base for the management of contaminants in soils, natural waters, and the atmosphere.

Advanced Separation Science. Chemical separations are vital to energy savings and process improvements in energy and environmental technologies. BES draws from chemistry, engineering, and computational science to advance separations science from the identification of new chemical structures for membranes to detailed molecular dynamics simulations of selective permeation processes.

Combustion Research. Fundamental combustion research is critical to improving the efficiency of combustion processes while reducing their environmental impact. BES combines theoretical and experimental research on molecular energetics, chemical process dynamics, and reaction rates to develop quantitative models of combustion-generated pollutants and flames.

Solar Energy Conversion. Photochemical and photophysical energy research develops new approaches to utilize light in energy processes. BES forges links between theory and experiment to develop photoactive molecules and materials, to uncover the mechanism of photosynthesis, and to develop more efficient photovoltaic materials.

Engineering Sciences. Innovative engineering approaches are needed to meet many challenges in energy and environmental technology. BES engineering research extends underlying knowledge in energy-related areas including fluid and solid mechanics, heat transfer, intelligent machines, instrumentation and diagnostics for process and environmental control, and dynamical systems for engineering applications.